

# Marine Molluscan Fauna of Jindo Island

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## ABSTRACT

As a part of the commemorative joint faunal survey for the 30th anniversary of the Korean Society of Systematic Zoology, the molluscan fauna of Jindo Island was investigated based on sample collection from 6 localities from the 6 to the 8 of Jul 2016. A total of 114 molluscan species from 47 families were collected and identified. Among these, 42 species from 11 families are newly reported from Jindo Island and combining the previous records with the present study totals 157 species from 57 families. Distribution of species records indicates that marine biogeography of Jindo Island represent an overlapping zone for marine organisms which dwell in the Yellow sea and the southern sea areas of Korean waters.

**Keywords:** molluscan fauna, Jindo Island, Korea, biodiversity, overlapping zone

## INTRODUCTION

Jindo Island is the third largest island in Korea after Jeju-do and Geoje-do Islands. It is located on the boundary of the Yellow sea and southern sea of the Korean peninsula. For this reason Jindo Island is known to be biogeographically important region and maintain high biodiversity for marine organisms (Kim and Kwon, 1983; Kil et al., 2005). In previous surveys for molluscan fauna of Jindo Island, 117 species from 45 families have been recorded (Kim and Kwon, 1983; Choe, 1992, 2000, 2002a, 2002b; Choe and Park, 1993, 1997; Yum, 1995; Choe et al., 1999; Kil et al., 2005). Most of the previous studies except for Kim and Kwon (1983) and Kil et al. (2005) were conducted as part of a survey of the natural environment or as part of a study of specific molluscan taxonomic groups. In both Kim and Kwon (1983) and Kil et al. (2005), comprehensive surveys of the molluscan fauna of Jindo Island were performed. Those two studies suggested that the Jindo Island waters are an overlapping zone of marine organisms which dwell in the Yellow sea and the southern sea areas of Korean waters. This work was part of a joint survey of the invertebrate fauna of Jindo Island to commemorate the 30th anniversary of the

Korean Society of Systematic Zoology. The present study reports comprehensive survey of molluscan fauna of Jindo Island by comparison of the previous records with current data information in species composition.

## MATERIALS AND METHODS

Samples of marine mollusks were collected in 6 localities which included 20 survey locations from the 6 to the 8 of Jul 2016 (Fig. 1). Specimens were mostly collected from intertidal zones at low-water sea levels. Samples were preserved in 95% ethyl alcohol or in 10% neutral formalin before the morphological examination. Species identification of the specimens was performed with a stereoscopic microscope (Leica M205C; Leica, Wetzlar, Germany) (Okutani, 2000; Min et al., 2004). All specimens are deposited in the Marine Mollusk Resource Bank of Korea (MMRBK).

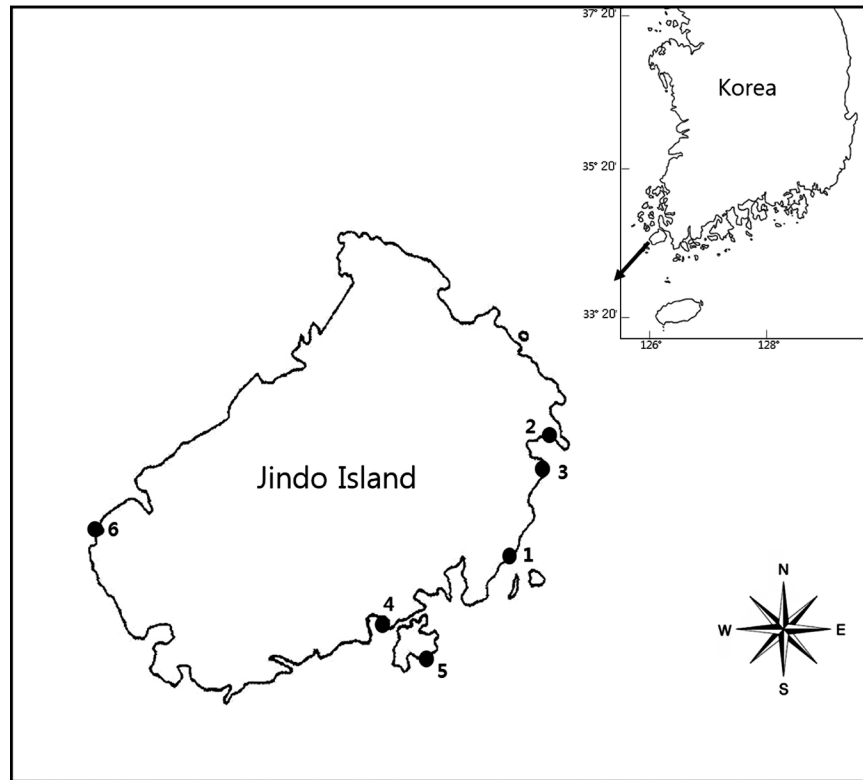
## RESULTS AND DISCUSSION

A total of 114 molluscan species from 47 families were col-

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**Fig. 1.** Map showing the collection localities. 1, Gagye; 2, Wonpo; 3, Beolpo; 4, Geumgap beach; 5, Jeopdo Isand; 6, Gahak.

lected and identified during this investigation. Among these, 42 species from 11 families are those newly reported in this survey. We confirmed 72 of the 117 species that were listed in previous reports, including *Onchidella kurodai* (Taki, 1935). If the present data is combined with previous records, a total of 157 molluscan species from 57 families have been recorded from the Jindo Island (Table 1). Endangered species and legally protected species such as natural monuments were not found in this study.

The intertidal zones of the Jindo Island area consist mostly of mixed rocks, sand, and mud, and provide a habitat for a variety of marine organisms. Some of the discovered molluscan species (*Lottia luchuana* (Pilsbry, 1901), *Bittium glareosum* Gould, 1861, *Macroschisma dilatatum* A. Adams, 1851, *Cantharidus callichroa* (Philippi, 1850), *Cantharidus hirasei* Pilsbry, 1901, *Homalopoma sangarens* (Schrenck, 1861), *Bostrycapulus gravispinosus* (Kuroda & Habe, 1950), *Lataxiena fimbriata* (Hinds, 1844), *Hytissa chemnitzii* (Hanley, 1846), *Kellia porculus* Pilsbry, 1904) from Jindo Island area are also recorded from Jeju Island, the southern part of Korean waters, and even the Eastern Sea. Thus, the Jindo Island shows a distinct biogeographic pattern that contains marine molluscan species from both the Yellow sea and the

South Sea of Korea; this demonstrates that from a biogeographical point of view, the Jindo Island area is an overlapping zone for marine organisms which dwell in the Yellow sea and the southern sea areas of Korean waters. Furthermore, this area is located where the Kuroshio warm current, flowing from the South China Sea, splits into two branches along the western coast and southern coast of the Korean peninsula. This hydrography influences regional biogeography of Jindo Island that is characterized by an assemblage of both western and southern malacofauna of Korean waters. Therefore, conservation efforts for the marine ecosystem and marine invertebrates in Jindo Island area is important for protecting the diversity and distribution of marine invertebrate in Korean waters.

## ACKNOWLEDGMENTS

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**Table 1.** Comparing this investigation and previous investigation

Class	Family	Species	Previous studies		Present study
			Reference <sup>a</sup>	Kil et al. (2005)	
Polyplocophora Blainville, 1816	Ischnochitonidae Dall, 1889	<i>Ischnochiton boninensis</i> Bergenhayn, 1933	8, 9	-	•
		<i>Ischnochiton comptus</i> (Gould, 1859)	8, 9	•	•
		<i>Ischnochiton</i> sp.	1	-	-
	Mopaliidae Dall, 1889	<i>Lepidozona coreanica</i> (Reeve, 1847)	1, 8, 9	•	•
		<i>Mopalia retifera</i> Thiele, 1909	-	-	•
		<i>Placiphorella stimpsoni</i> (Gould, 1859)	9	-	•
	Chitonidae Rafinesque, 1815	<i>Chiton kurodai</i> Is. & Iw. Taki, 1929	4, 8, 9	-	•
		<i>Liolophura japonica</i> (Lischke, 1873)	1, 8, 9	•	•
		<i>Acanthochitona achates</i> (Gould, 1859)	8, 9	•	•
	Acanthochitonidae Pilsbry, 1893	<i>Acanthochitona circellata</i> (A. Adams & Reeve MS, Reeve, 1847)	4	-	-
		<i>Acanthochitona defilippii</i> (Tapparone Canefri, 1874)	1, 4	•	•
		<i>Acanthochitona rubrolineata</i> (Lischke, 1873)	1, 4	•	•
		<i>Cryptoplax japonica</i> Pilsbry, 1901	-	-	•
	Cryptoplacidae H. Adams & A. Adams, 1858	<i>Cellana grata</i> (Gould, 1859)	7	-	-
		<i>Cellana toreuma</i> (Reeve, 1854)	1, 7, 8, 9	•	•
Gastropoda Cuvier, 1797	Nacellidae Thiele, 1891	<i>Lottia dorsuosa</i> (Gould, 1859)	1	-	•
		<i>Lottia kogamogai</i> Sasaki & Okutani, 1994	8	-	•
	Lottiidae Gray, 1840	<i>Lottia luchuana</i> (Pilsbry, 1901)	-	-	•
		<i>Lottia tenuisculptata</i> Sasaki & Okutani, 1994	-	-	•
		<i>Nipponacmea concinna</i> (Lischke, 1870)	1, 8, 9	•	•
		<i>Nipponacmea fuscoviridis</i> (Teramachi, 1949)	2, 8, 9	•	•
		<i>Nipponacmea radula</i> (Kira, 1961)	-	-	•
		<i>Nipponacmea schrenckii</i> (Lischke, 1868)	1	-	•
		<i>Niveotectura pallida</i> (Gould, 1859)	1, 7	-	•
		<i>Patelloida conulus</i> (Dunker, 1861)	7, 8, 9	•	•
		<i>Patelloida pygmaea</i> (Dunker, 1860)	9	•	•
		<i>Patelloida saccharina</i> f. <i>lanx</i> (Reeve, 1855)	7, 8	•	•
		<i>Haliotis discus</i> Reeve, 1846	-	-	•
		<i>Macroschisma dilatatum</i> A. Adams, 1851	1, 9	•	•
		<i>Macroschisma sinense</i> A. Adams, 1855	-	-	•
		<i>Tugali decussata</i> A. Adams, 1852	-	•	-
		<i>Cantharidus callichroa</i> (Philippi, 1850)	1, 7, 8	•	•
		<i>Cantharidus hirasei</i> Pilsbry, 1901	9	-	-
		<i>Cantharidus japonicus</i> (A. Adams, 1853)	8, 9	•	•
		<i>Cantharidus urbanus</i> (Gould, 1861)	-	-	•
		<i>Komaitrochus pulcher</i> Kuroda & Iw. Taki, 1958	-	-	•
		<i>Lirularia iridescens</i> (Schrenck, 1863)	9	•	•
		<i>Monodonta australis</i> (Lamarck, 1822)	-	-	•
		<i>Monodonta labio</i> (Linnaeus, 1758)	1, 6	-	-
		<i>Monodonta labio confusa</i> Tapparone Canefri, 1874	7, 8, 9	•	•
		<i>Monodonta perplexa</i> Pilsbry, 1889	1, 6	-	-
		<i>Umbonium costatum</i> (Kiener, 1839)	1	•	-
		<i>Umbonium thomasi</i> (Crosse, 1863)	1	-	-

Table 1. Continued

Class	Family	Species	Previous studies		Present study
			Reference <sup>a</sup>	Kil et al. (2005)	
Gastropoda Cuvier, 1797	Tegulidae Kuroda, Habe & Oyama, 1971	<i>Chlorostoma lischkei</i> (Tapparone Canefri, 1874)	7, 8, 9	•	•
		<i>Chlorostoma turbinatum</i> (A. Adams, 1853)	–	–	•
		<i>Chlorostoma xanthostigma</i> A. Adams, 1853	–	–	•
	Chilodontidae Wenz, 1938	<i>Omphalius nigerrimus</i> (Gmelin, 1791)	1	–	–
		<i>Omphalius rusticus</i> (Gmelin, 1791)	7, 8, 9	•	•
		<i>Granata lyrata</i> (Pilsbry, 1890)	–	–	•
	Calliostomatidae Thiele, 1924 (1847)	<i>Calliostoma consors</i> (Lischke, 1872)	–	–	•
		<i>Calliostoma unicum</i> (Dunker, 1860)	–	–	•
		<i>Bothropoma pilula</i> (Dunker, 1860)	–	–	•
	Colloniidae Cossmann, 1917	<i>Homalopoma amussitatum</i> (Gould, 1861)	8	–	•
		<i>Homalopoma sangarense</i> (Schrenck, 1861)	7	–	–
		<i>Lunella correensis</i> (Récluz, 1853)	1, 7, 8	•	•
	Turbinidae Rafinesque, 1815	<i>Nerita japonica</i> Dunker, 1860	1, 2, 7, 8, 9	•	•
		<i>Bittium glareosum</i> Gould, 1861	–	•	–
		<i>Rhinoclavis kochi</i> (Philippi, 1848)	3	–	–
	Neritidae Rafinesque, 1815	<i>Batillaria cumingii</i> (Crosse, 1862)	1, 2	•	•
		<i>Batillaria multiformis</i> (Lischke, 1869)	1, 2, 6, 8	•	•
		<i>Cerithideopsilla cingulata</i> (Gmelin, 1791)	2, 6	•	•
	Cerithiidae Fleming, 1822	<i>Cerithideopsilla incisa</i> (Hombron & Jacquinot, 1848)	–	•	•
		<i>Epitonium japonicum</i> (Dunker, 1861)	–	–	•
		<i>Echinolittorina radiata</i> (Souleyet, 1852)	1, 7, 8, 9	•	•
	Potamididae H. Adams & A. Adams, 1854	<i>Littoraria articulata</i> (Philippi, 1846)	1	–	–
		<i>Littoraria scabra</i> (Linnaeus, 1758)	–	–	•
		<i>Littorina brevicula</i> (Philippi, 1844)	1, 7, 8, 9	•	–
	Barleeiidae Gray, 1857	<i>Barleeia trifasciata</i> Habe, 1960	7	•	–
		<i>Cheilea cepacea</i> (Broderip, 1834)	–	–	•
		<i>Sabia conica</i> (Schumacher, 1817)	2	–	•
	Calyptraeidae Lamarck, 1809	<i>Bostrycapulus gravispinosus</i> (Kuroda & Habe, 1950)	–	–	•
		<i>Crepidula onyx</i> G. B. Sowerby I, 1824	–	•	•
		<i>Ergaea walshi</i> (Reeve, 1859)	7	–	–
	Vermetidae Rafinesque, 1815	<i>Thylacodes adamsii</i> (Mörch, 1859)	7, 8, 9	•	•
		<i>Laguncula pulchella</i> Benson, 1842	1, 6	•	–
		<i>Neverita didyma</i> (Röding, 1798)	–	•	–
	Assimineidae H. Adams & A. Adams, 1856	<i>Assimineae estuarina</i> Have, 1946	–	–	•
		<i>Paludinelessimineae japonica</i> (Pilsbry, 1901)	–	–	•
		<i>Ceratosstoma burnetti</i> (Adams & Reeve, 1849)	8	–	•
	Muricidae Rafinesque, 1815	<i>Ceratosstoma rorifluum</i> (Adams & Reeve, 1849)	1, 2, 5, 6, 7, 8, 9	•	•
		<i>Lataxiena fimbriata</i> (Hinds, 1844)	–	–	•
		<i>Ocenebra inornata</i> (Récluz, 1851)	2, 5, 6, 8	•	•
	Pteropurpura falcata (G. B. Sowerby II, 1834)	<i>Pteropurpura falcata</i> (G. B. Sowerby II, 1834)	2	–	–
		<i>Rapana venosa</i> (Valenciennes, 1846)	–	•	•
		<i>Reishia bronni</i> (Dunker, 1860)	1	–	•
	<i>Reishia clavigera</i> (Küster, 1860)	<i>Reishia clavigera</i> (Küster, 1860)	1, 8, 9	•	•

Table 1. Continued

Class	Family	Species	Previous studies		Present study
			Reference <sup>a</sup>	Kil et al. (2005)	
Gastropoda Cuvier, 1797	Muricidae Rafinesque, 1815 Columbellidae Swainson, 1840	<i>Reishia luteostoma</i> (Holtén, 1803)	7, 8, 9	—	•
		<i>Columbellopsis bella</i> (Reeve, 1859)	—	—	•
	Nassariidae Iredale, 1916 (1835)	<i>Mitrella bidincta</i> (Gould, 1860)	1, 7, 9	•	•
		<i>Mitrella lischkei</i> (Smith, 1879)	2	•	—
		<i>Mitrella tenuis</i> (Gaskon, 1851)	—	—	•
		<i>Hima fratercula hypolia</i> (Pilsbry, 1895)	—	—	•
	Buccinidae Rafinesque, 1815	<i>Nassarius castus</i> (Gould, 1850)	—	•	—
		<i>Nassarius festivus</i> (Powys, 1835)	1, 2, 8	•	•
		<i>Nassarius fraterculus</i> (Dunker, 1860)	2, 7, 8, 9	•	•
		<i>Nassarius livescens</i> (Philippi, 1849)	1	—	•
		<i>Nassarius multigranulosus</i> (Dunker, 1847)	—	—	•
		<i>Nassarius reeveanus</i> (Dunker, 1847)	—	—	•
		<i>Nassarius siquijorensis</i> (A. Adams, 1852)	—	—	•
		<i>Cantharus cecilleri</i> Philippi, 1844	1	•	•
		<i>Japeuthria ferrea</i> (Reeve, 1847)	1, 8, 9	•	•
		<i>Fusinus perplexus</i> (A. Adams, 1864)	1	—	—
Bivalvia Linnaeus, 1758	Fasciolaridae Gray, 1853 Mitridae Swainson, 1831 Haminoeidae Pilsbry, 1895	<i>Vexillum inerme</i> (Reeve, 1845)	2, 8	•	•
		<i>Bullacta exarata</i> (Philippi, 1849)	—	•	•
		<i>Haminoea japonica</i> Pilsbry, 1895	1, 8, 9	•	•
		<i>Aplysia parvula</i> Mörch, 1863	—	—	•
	Aplysiidae Lamarck, 1809 Chromodorididae Bergh, 1891 Discodorididae Bergh, 1891 Onchidiidae Rafinesque, 1815 Siphonariidae Gray, 1827 Arcidae Lamarck, 1809	<i>Chromodoris orientalis</i> Rudman, 1983	—	—	•
		<i>Rostanga orientalis</i> Rudman & Avern, 1989	—	—	•
		<i>Onchidella kurodai</i> (Iw. Taki, 1935)	—	•	•
		<i>Siphonaria japonica</i> (Donovan, 1824)	1, 7, 8, 9	•	•
		<i>Anadara broughtonii</i> (Schrenck, 1867)	1, 7	—	—
		<i>Anadara sativa</i> (Bernard, Cai & Morton, 1993)	—	•	•
		<i>Arca boucardi</i> Jousseaume, 1894	7	—	•
		<i>Arca patriarchalis</i> Röding, 1798	—	—	•
		<i>Barbatia virescens</i> (Reeve, 1844)	—	—	•
		<i>Mesocibota bistrigata</i> (Dunker, 1866)	—	—	•
	Noetiidae Stewart, 1930	<i>Tegillarca granosa</i> (Linnaeus, 1758)	—	•	•
		<i>Didimacar tenebrica</i> (Reeve, 1844)	7	•	•
		<i>Estellacar olivacea</i> (Reeve, 1844)	—	•	—
		<i>Striarca symmetrica</i> (Reeve, 1844)	8, 9	•	•
Mytilidae Rafinesque, 1815		<i>Arcaatula senhousia</i> (Benson, 1842)	—	•	—
		<i>Brachidontes mutabilis</i> (Gould, 1861)	—	—	•
		<i>Gregariella coralliphaga</i> (Gmelin, 1791)	—	—	•
		<i>Modiolus auriculatus</i> (Krauss, 1848)	—	—	•
		<i>Modiolus kurilensis</i> F. R. Bernard, 1983	1, 7, 8, 9	•	—
		<i>Modiolus nipponicus</i> (Oyama, 1950)	—	•	•
		<i>Mytilus coruscus</i> Gould, 1861	7	—	•
		<i>Mytilus galloprovincialis</i> Lamarck, 1819	—	•	•
		<i>Septifer keenae</i> Nomura, 1936	—	•	•

Table 1. Continued

Class	Family	Species	Previous studies		Present study
			Reference <sup>a</sup>	Kil et al. (2005)	
Bivalvia Linnaeus, 1758	Mytilidae Rafinesque, 1815	<i>Septifer virgatus</i> (Wiegmann, 1837)	1, 7, 8	•	•
	Pectinidae Rafinesque, 1815	<i>Xenostrobus atratus</i> (Lischke, 1871)	7, 8	–	•
		<i>Chlamys farreri farreri</i> (Jones & Preston, 1904)	–	–	•
		<i>Chlamys farreri nipponensis</i> (Kuroda, 1932)	1	–	–
		<i>Chlamys irregularis</i> (G. B. Sowerby II, 1842)	7	–	–
		<i>Scaechlamys squamata</i> (Gmelin, 1791)	7	–	–
		<i>Anomia chinensis</i> Philippi, 1849	–	–	•
		<i>Pododesmus macrochisma</i> (Deshayes, 1839)	7	–	–
		<i>Hyofissa chemnitzii</i> (Hanley, 1846)	–	–	•
		<i>Crassostrea gigas</i> (Thunberg, 1793)	1, 7, 8	•	•
	Ostreidae Rafinesque, 1815	<i>Ostrea denselamellosa</i> Lischke, 1869	–	•	–
		<i>Saccostrea kegaki</i> Torigoe & Inaba, 1981	9	•	–
		<i>Striostrea circumpicta</i> (Pilsbry, 1904)	–	–	•
	Galeommatidae Gray, 1840	<i>Pseudogaleomma japonica</i> (A. Adams, 1862)	–	–	•
	Lasaeidae Gray, 1842	<i>Lasaea undulata</i> (A. A. Gould, 1861)	7	•	•
	Kelliidae Forbes & Hanley, 1848	<i>Kellia porculus</i> Pilsbry, 1904	–	–	•
	Mactridae Lamarck, 1809	<i>Mactra quadrangularis</i> Reeve, 1854	–	•	–
	Trapezidae Lamy, 1920 (1895)	<i>Neotrapezium liratum</i> (Reeve, 1843)	–	•	•
	Veneridae Rafinesque, 1815	<i>Clementia papyracea</i> (Gmelin, 1791)	6	–	–
<i>Cyclina sinensis</i> (Gmelin, 1791)		–	–	–	
<i>Dosinia corrugata</i> (Reeve, 1850)		–	•	–	
<i>Macridiscus aequilatera</i> (G. B. Sowerby I, 1825)		1, 6	–	–	
<i>Ruditapes philippinarum</i> (Adams & Reeve, 1850)		1	•	•	
<i>Glauconome chinensis</i> Gray, 1828		–	•	–	
<i>Cardita leana</i> Dunker, 1860		7, 9	•	–	
<i>Laternula anatina</i> (Linnaeus, 1758)		–	•	–	
<i>Loliolus (Nipponololigo) beka</i> (Sasaki, 1929)		1	–	–	
<i>Octopus minor</i> (Sasaki, 1920)		–	•	–	
Cephalopoda Cuvier, 1797	Glauconomidae Gray, 1853				
	Carditidae Férussac, 1822				
	Laternulidae Hedley, 1918 (1840)				
	Loliginidae Lesueur, 1821				
	Octopodidae d'Orbigny, 1840				

<sup>a</sup>1, Kim and Kwon (1983); 2, Choe (1992); 3, Choe and Park (1993); 4, Yum (1995); 5, Choe and Park (1997); 6, Choe et al. (1999); 7, Choe (2000); 8, Choe (2002a); 9, Choe (2002b).

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